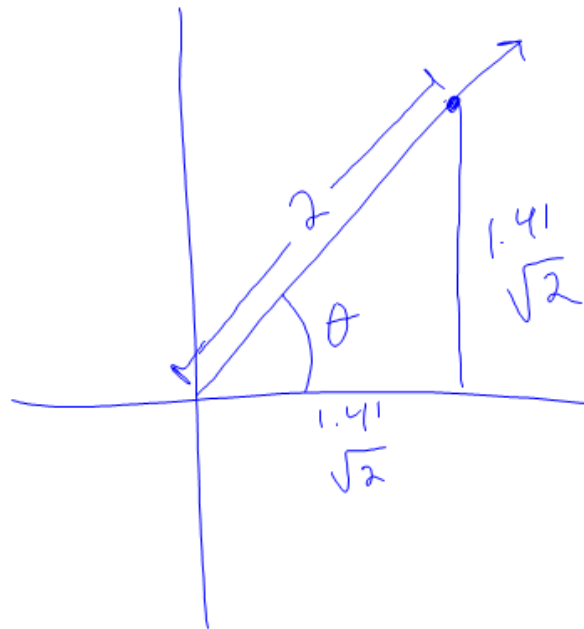


$$x = t \cos 45^\circ \quad t = 2 \quad 1.41$$

$$y = t \sin 45^\circ \quad 1.41$$



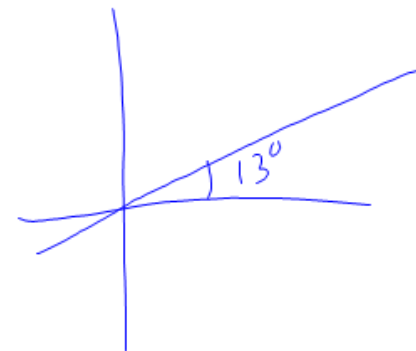
$$\tan \theta = \frac{\sqrt{2}}{\sqrt{2}}$$

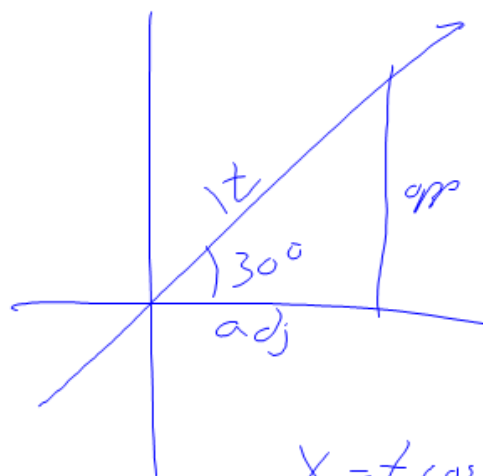
$$\theta = \tan^{-1} \left(\frac{\sqrt{2}}{\sqrt{2}} \right)$$

$$\theta = 45^\circ$$

$$x = t \cos 13^\circ$$

$$y = t \sin 13^\circ$$





$$x = t \cos 30$$

$$y = t \sin 30$$

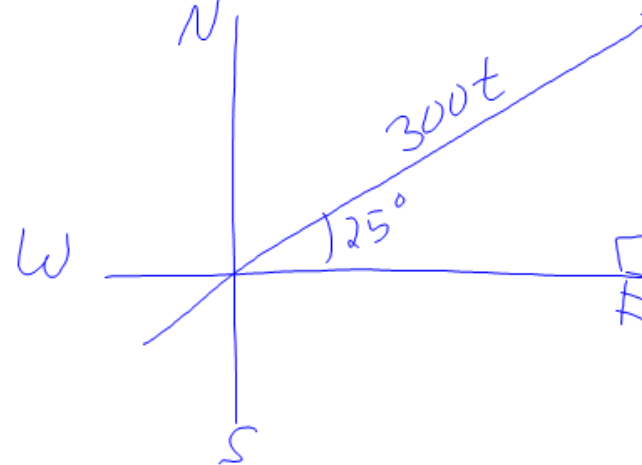
How far east & north
is the plane after 4 hours

East 507.14 mi
North 1087.57 mi

flying a plane at
300 mph at an
angle of 25° to
horizontal, write
parametric equations

$$x = 300t \cos 25^\circ$$

$$y = 300t \sin 25^\circ$$



Concept! Eliminating the parameter

Sect. 6.2

Rule:

Every set of parametric equations can be written as a "normal", i.e. functional, equation by eliminating the parameter, t .

- ① Solve the x -equation for t
- ② plug this in for t in the y -equation

Example

$$\begin{array}{l} x = t - 2 \\ y = t^2 \end{array} \rightarrow \begin{array}{l} t = x + 2 \\ \downarrow \\ y = (x + 2)^2 \end{array}$$

Concept: Basic Trig Functions

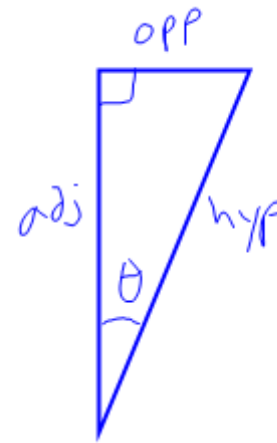
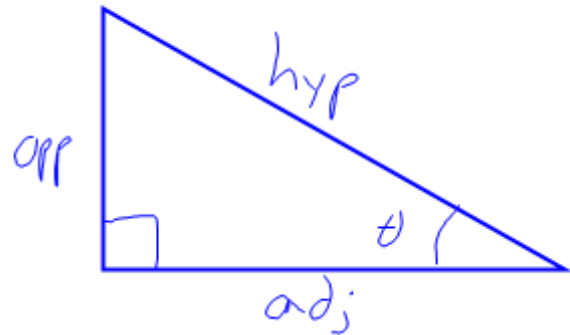
Sect. 6.3

Rule: $\theta \rightarrow$ typical angle variable

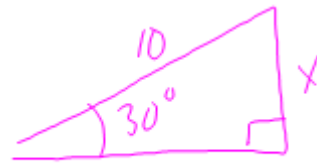
$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$



To find side

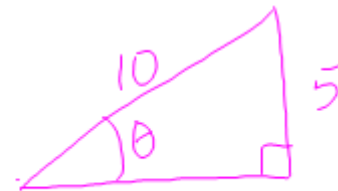


$$\sin 30^\circ = \frac{x}{10}$$

$$x = 10 \sin 30^\circ$$

$$x = 5$$

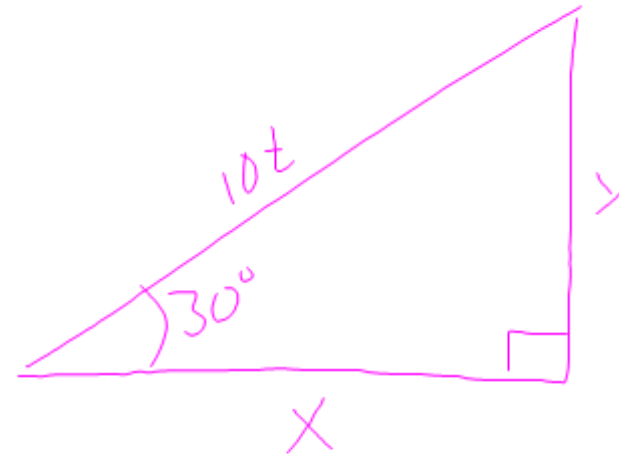
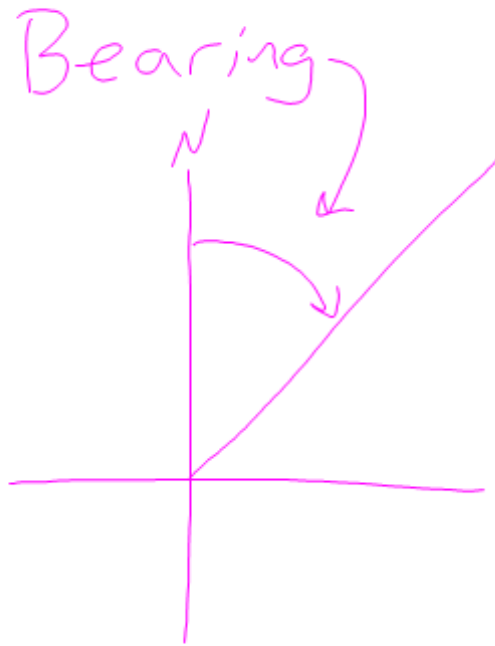
To find angle



$$\sin \theta = \frac{5}{10}$$

$$\theta = \sin^{-1}\left(\frac{5}{10}\right)$$

$$\theta = 30^\circ$$



b) $0 \leq t \leq 10$

horiz. Dist. $\rightarrow x = 10t \cos(30)$

vert. dist. $\rightarrow y = 10t \sin(30)$

\swarrow speed \nwarrow time \searrow angle

11

$$x = 18t \cos 73$$

$$y = 18t \sin 73$$

a) $\frac{750}{18} = 41.6$

HW

#12

in sect. 6.3